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Gas Journal

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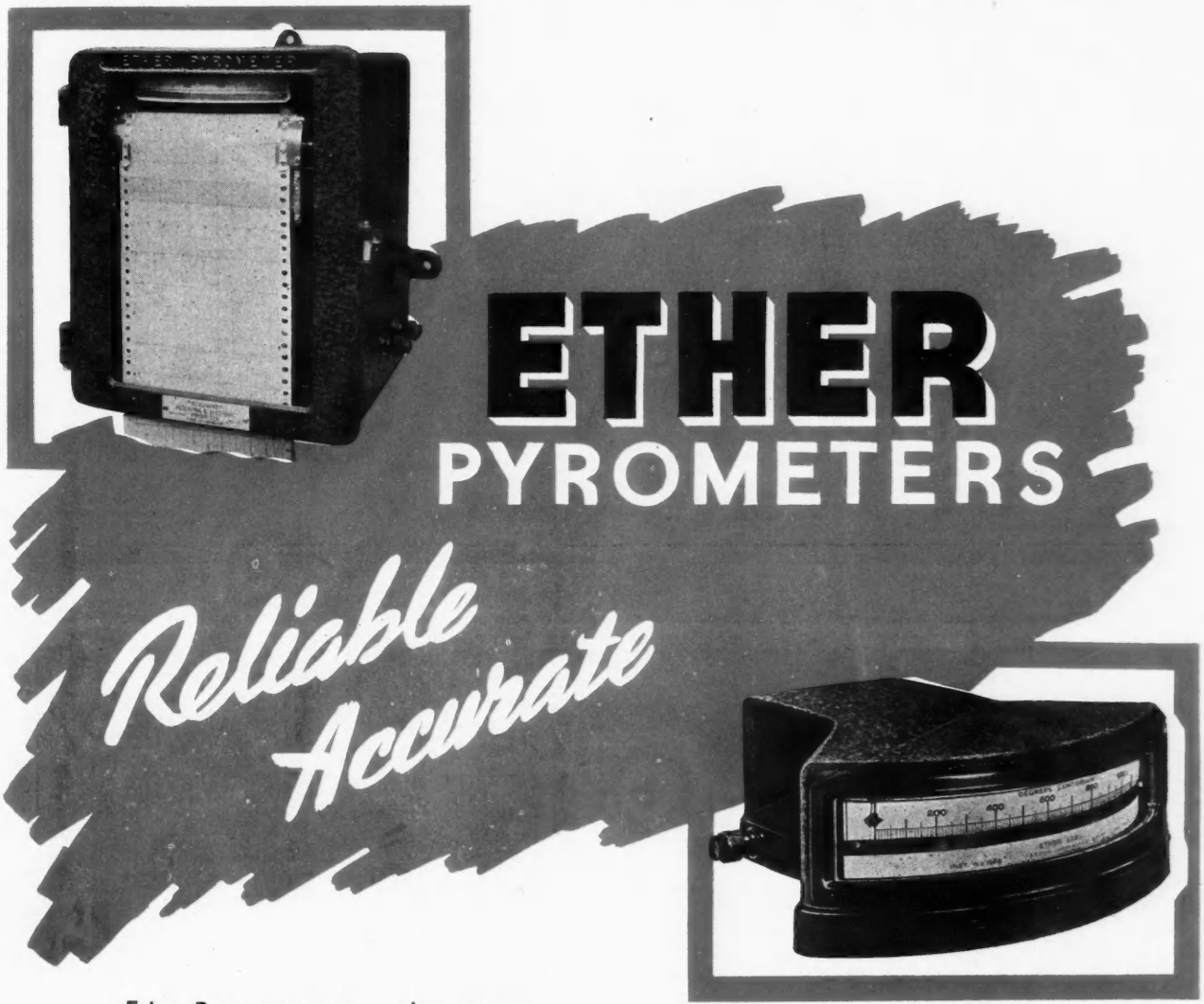

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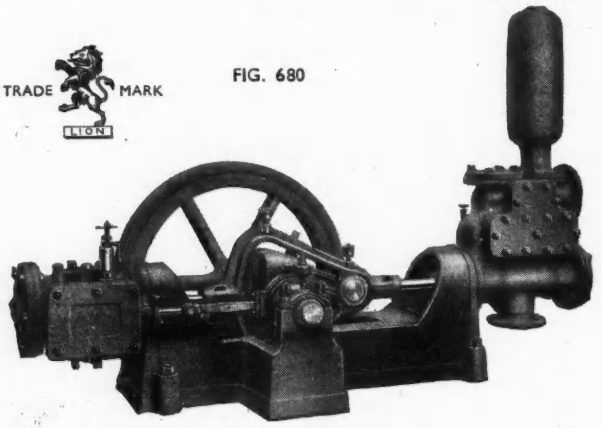

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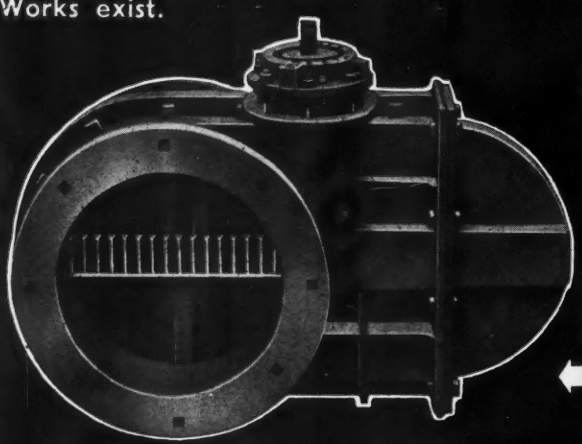

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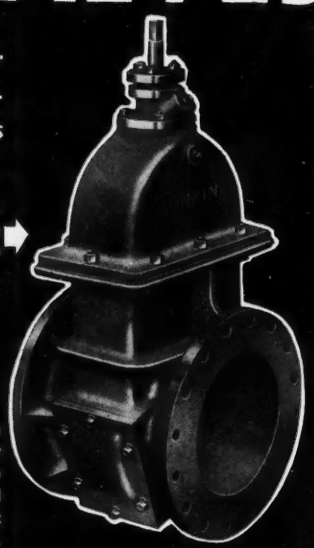

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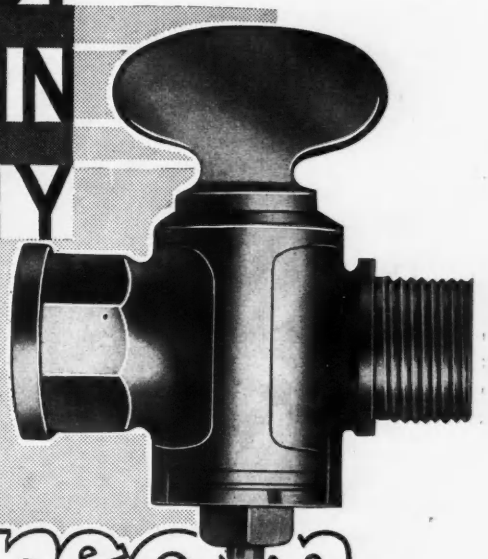

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above Acts and Regulations, and was stamped
RESULTS OF TESTING.
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GAS JOURNAL, SEPT. 24, 1941

VOL. 235 93rd YEAR No. 4088

EDITORIAL NOTES

GOING, GOING, ——?

APROPOS the present general demand for Gas Industry re-organization, Mr. James Jamieson calls our attention to a letter which appeared in the "JOURNAL" in Nov., 1918—at the end of the last great war. If the subject was not one of the utmost seriousness, we might be tempted to ask how many world upheavals will be required to jerk the Industry into real motion since, in the midst of the second one within a generation, we are still thinking along the same lines. We believe that something will be done as the outcome of the present movement. We sincerely hope it will since, as we pointed out in a recent article, there is grave danger, in default of positive and constructive action, that gas will miss its rightful place in the comity of fuel industries, or whatever form is devised to meet the fuel requirements of the post-war nation.

The letter to which we refer read as follows:

"A UNITED ASSOCIATION FOR THE GAS INDUSTRY.

"SIR,

"Now that reconstruction is so much in the air, it does seem a thousand pities that The Institution of Gas Engineers does not take the bull by the horns, and propose the only scheme of reconstruction that appears likely to receive general support and prove of permanent advantage to the Gas Industry.

"I refer to the merging of the five gas organizations—namely, The Institution of Gas Engineers, the National Gas Council, the British Commercial Gas Association, the Gas Companies' Protection Association, and the Society of British Gas Industries—into one central body, to be called (say) the British Gas Association, within which every interest might find a place, with its separate Committee and Chairman—all under the control of a thoroughly representative Committee or Council.

"I cannot but think that to this complexion the Industry must come, sooner or later, and why not sooner rather than later, especially in view of the very important reconstruction problems with which it is likely to be confronted at the end of the war.

"The time has surely arrived for putting an end to all distracted counsels. In what better way could we commemorate the peace that is coming?

"CHARLES HUNT.

"17, Victoria Street, Westminster,
"*Nov.* 1, 1918."

CALORIFIC VALUE

THREE years ago—in October of 1938—we discussed in these columns the bewildering variations in declared calorific value and put forward the view that the values of 500, 475, and 450 B.Th.U would cover the types of coal carbonized in Great Britain and should satisfy the preferences of any gas engineer. It will be recalled that at the Institution meeting last June Sir Frederick West, in his Paper on standardization of calorific values, suggested that declarations of 500, 475, 450, and 425 B.Th.U. would satisfy all, or very nearly all, requirements. A small Committee of Enquiry, consisting of Messrs. George Dixon, E. Crowther, and T. Campbell Finlayson, has since been set up to deal with the question.

In 1938—writing, it must be borne in mind, in circumstances very different from those of to-day in the Gas Industry—we commented on steaming and the coke market and on therms per retort. We expressed the opinion that more attention might well be paid to the retort as a unit of basic cost of gas manufacture, pointing to the importance of the time factor. The greater the amount of coal carbonized in a given time, we said, the lower becomes the incidence of both capital cost and labour cost per therm of gas made, and this brought us to the question of benzole recovery from the gas made in continuous vertical retorts. We suggested that thought should be given to consider whether it would pay better to make a "fatter" therm with less steaming and reduce the calorific value by extracting benzole. We realized at the time that the whole problem had to be regarded in the light of the coke market, but we advocated a real drive to extend this market. We realized, too, the influence of the type of coal carbonized on the question. The leaner Scottish coals, for example, lend themselves to processes involving steaming, whereas Durham coals lend themselves more particularly to processes producing high calorific value gas. We had in mind, too, the quality of the types of coke produced from the different types of coal.

There were some who disagreed with the arguments we advanced on the subject in 1938, and the reason why we return to it now is that a correspondent has written us an interesting letter in which he points to the recent tendency of undertakings to re-declare their calorific values at a lower standard—*e.g.*, from 500 to 475 and 475 to 450—consequent upon benzole recovery. He then suggests that this fact "explodes" our 1938 views. We find it hard to believe, however, that these arguments, advanced at a time when the coal-coke price ratio was favourable and could have been made better, are fundamentally unsound. Since then, as we have said, conditions have changed very greatly, and, of course, the position in regard to coal supplies has exercised and must exercise a major influence. We had no wish to be dogmatic in 1938, and we certainly have no wish to be dogmatic to-day; but it hardly seems legitimate to argue from war conditions to suggestions made when we were at peace and everything was so very different.

Looking at the matter broadly, however, the wide variation in declared calorific values must strike us all as being a matter for concern and for remedy without delay. The small Committee to which we have referred is well qualified to sift evidence and to make recommendations; and once more we express the hope that appropriate and rapid action will be taken when these recommendations are made to put them into practical effect.

CALLS TO ARMS

EVEN while we are assailed from all sides by the clamour for arms, more arms, and intensified help in every quarter, the Gas Industry is being urged with steadily growing force to arm itself in other ways so that it may play its appropriate part in the attacks upon the domestic front which will follow upon the struggle against aggression from abroad. As the country was slow to realize the magnitude of the task that lay ahead, so the Industry has been backward in preparing for the fight which it will have to wage. May the analogy be carried further, by saying that the country has awakened to its peril, and that the Gas Industry has already begun to sit up and rub its eyes? To the large volume of evidence bearing out the latter point that has already found place in the pages of the "JOURNAL" has now to be added that furnished by last week's meeting of the Wales and Monmouthshire Association. No longer is it a question of whether anything should be done—but only of what should be done. Times are changed indeed; the Gas Industry must change to meet these changes.

Strangely enough, the changes in the times were reflected in

some measure at the very opening of the proceedings in Cardiff, when the outgoing President, Mr. R. L. Aspinall, made sympathetic reference to the great loss which the Association and the Industry had sustained through the death of Mr. H. D. Madden. During the large part of his life that he had spent in South Wales (not to mention his earlier period in London) Mr. Madden had endeared himself to all with whom he came in contact. Upon these friends he made many (and happy) lasting impressions—of thoughtfulness for others, of help to those who were in most need of help, of a retiring disposition, and of an old-world graciousness to all. Amid the attacks of to-day and the problems of to-morrow, there can be but scant opportunity for dwelling upon the past. Yet many of those who found themselves last week once again upon ground that was so reminiscent of their departed friend must have had their minds irresistibly drawn away from all preoccupations, and have experienced a great yearning after those peaceful and happy days of which we feel that Mr. Madden's whole attitude towards life was symbolic.

Though the barriers are high and the going must be heavy, peaceful days will return, with the might and the spirit of our great nation unbroken; but what of the happiness? Well, the happiness may be farther to seek; perhaps, when secured, more satisfying and more lasting than the happiness we knew before, but certainly differing from it in many respects. And there is very small likelihood of its being found in places within the reach of those who remain leaning back contentedly in their armchairs. These thoughts are general; but they may be brought within the orbit of our own Industry. To what extent is the Gas Industry already conscious of the need to fight hard, and to fight always, for its own future—its own happiness? As we have said, much testimony on the subject has already appeared in our pages, and the meeting of the Wales and Monmouthshire Association has further added to it. The Institution President, Sir Frederick J. West, was present during the whole of the proceedings, and we feel sure he will report to headquarters that the area covered by the Association is "sound," and that what he heard affords solid grounds for the hope expressed by him that "with the loyal co-operation of the various District Associations, it may be found possible to solve some of the difficult problems that lie ahead." Though, of course, infinitely more remains to be done than has already been accomplished in the way of preparing to carry on the fight for the Gas Industry, yet a start has been made, and the flame that has been kindled will increase in intensity with the passing of time. Wales and Monmouthshire will help to see to this.

GAS CONSUMPTION STATISTICS

WE call attention to the informative set of statistics relating to gas consumption which, compiled by Dr. W. E. le B. Diamond, Assistant Secretary of The Institution of Gas Engineers, was published in the "JOURNAL" of Sept. 10. The figures are highly interesting as a basis for arriving at deductions regarding possible future consumption, the assumption being made that after the war the amount a family of any section of the community will be prepared to spend on fuel and light will not be greatly different from pre-war expenditure. Given attractive tariffs—this is essential—the data point to the great potentialities which would appear to lie ahead for the Industry. The statistics, which are opportune and demonstrate the need for the collecting and sifting of such information, should prove very helpful in considering post-war plans.

Grey Edition of the Symposium

The Institution of Gas Engineers has now published the Grey Book of the June Symposium on the Gas Industry : 1941 and After. It combines the Papers and the oral and written discussion, and is a valuable and compact document which will prove a much-used source of reference, appearing at a time when plans are being laid for the future of the Industry. A limited number of copies are available for sale, the price being 2s. 6d. Applications should be made to the Secretary of the Institution at 1, Grosvenor Place, S.W. 1.

Personal

Mr. E. F. GORMAN has been appointed Engineer to the Christchurch Gas, Coal and Coke Company, New Zealand. Mr. Gorman is the only son of the late Mr. Frederic Gorman, who was Engineer to the South Suburban Gas Company. He received his early training as a pupil to the Woodall-Duckham Companies, and later as a student engineer to the South Metropolitan Gas Company. In 1938 Mr. Gorman resigned from his position as a Technical Assistant to the Chief Engineer of the East Greenwich Gas-Works of the South Metropolitan Company, in order to proceed to Australia to take up a post with the Colonial Gas Association Ltd., of Melbourne. Mr. Gorman took up his duties in New Zealand early in July.

* * *

We learn that Mr. F. W. J. BELTON has left Christchurch on his appointment as Engineer to the National Oil Proprietary for Glen Davis, New South Wales, incorporated by Special Act of Parliament and engaged in the production of oil by the retorting of shale.

* * *

Mr. T. C. FINLAYSON has been appointed a Director of the Woodall-Duckham Vertical Retort and Oven Construction Company (1920) Ltd. He graduated at Manchester University with an Honours B.Sc. Degree in Metallurgy and subsequently obtained an M.Sc. Degree by thesis. During the period 1915–18 he worked for the Factories Branch of the Department of Explosives (Ministry of Munitions). In 1921 he joined the development staff of the Woodall-Duckham Company. He became personal assistant to Dr. E. W. Smith in 1923, and has been Deputy Technical Director since 1932. For the past ten years he has been responsible for the co-ordination of the Company's design practice. In 1939 he was awarded (with Mr. W. Grogono) the Gold Medal of The Institution of Gas Engineers for a Paper on Static Vertical Retorts. He is a member of the Institution of Chemical Engineers and of The Institution of Gas Engineers, and a Fellow of the Institute of Fuel.

* * *

Mr. WILLIE BENNETT retired recently from the service of the Woodall-Duckham Company after an association of nearly forty years with the development and operation of the W.-D. system of continuous vertical retorts. He shared in the strenuous pioneer work at Bournemouth, under Colonel H. W. Woodall and the late Sir Arthur Duckham, which resulted in the inception of the system in 1903 and which laid the foundation for its success. Before commencing his association with the Gas Industry, Mr. Bennett served for 21 years in the Royal Navy. As long ago as 1889 he was a member of the crew of H.M.S. "Calliope," the only ship to survive the Samoan hurricane of that year.

Managers of gas undertakings having W.-D. plants, and their staffs, will miss his breezy visits and his witticisms. He had a *bon mot* for every occasion, collected during visits to all parts of the world.

His many friends in the Industry will wish him many years of happiness in his well-earned retirement.

* * *

At the commencement of the present month, after 47 years' service, Mr. ALFRED BIRD retired from the position of Manager and Secretary of the Bromsgrove Gaslight and Coke Company, and he has been succeeded by his son, Mr. John S. Bird, who has been associated with him at the works during the past few years. Mr. Alfred Bird's connexion with the undertaking has been not only long, but also successful. When he went to Bromsgrove in 1894 his appointment followed a year in regard to which the Directors had reported the balance sheet was "the most adverse it had been their lot to present." At the end of Mr. Bird's first year of office everything had been changed for the better, and from that time the Company has never looked back. Mr. Bird was elected a Director of the Company in 1924, a position he still holds, and he was chosen as President of the Midland Association of Gas Engineers in 1930, during which year that body held its annual meeting at Bromsgrove.

* * *

Mr. P. SUMNER, Technical Assistant and Acting Chief Draughtsman to the St. Helens Corporation Gas Department, has been appointed Works Manager to the Birkenhead Corporation Gas Department. Recently, upon leaving to take up his new duties, Mr. Sumner was presented with an oak gate-leg table by the members of the staff.

* * *

Mr. T. A. HALL, whose tenure of the Gas Light & Coke Company's Gas Research Fellowship at the Imperial College of Science and Technology expires on Sept. 30 next, has been appointed to the Fellowship for a further year.

* * *

Mr. W. H. B. PORTER, of Hamilton, has been appointed Distribution Superintendent to Stockton-on-Tees Corporation Gas Department.

* * *

Mr. JAMES COWANS, for many years Secretary of the Wooler Gas Company, Ltd., has died aged 72.

Obituary

Henry Dacre Madden

An appreciation by J. Herbert Canning, Past President of The Institution of Gas Engineers

When Henry Dacre Madden, as a young man, came to South Wales thirty-five years ago, he was "a stranger in a strange land." He died at Cheltenham on Sept. 8, 1941, at the age of 65 and when on the following Friday he was laid to rest at Penarth, his funeral was attended by a host of friends assembled to pay their respectful homage to one who, by his sterling qualities of mind and heart, had won their esteem and affection.

He was trained under the Gas Light and Coke Company, and was also, for a time, with the firm of Sir John Aird, Ltd. On the completion of his articles he was appointed on the staff of the Company at Beckton until, in the year 1906, he became Station Manager of the Grangetown Gas-Works at Cardiff. In 1909 he succeeded the late Henry Morley as Chief Engineer of the Cardiff Gas Light and Coke Company, and was appointed Engineer and Manager in 1923. He was elected a member of The Institution of Gas Engineers in 1910, and thereafter served for several periods as a member of the Council. He was President for the year 1927–28, being the first President to come from a Welsh undertaking, and the Annual Meeting was held for the first time in Wales, at Cardiff, in 1928. Since 1932 he served in the capacity of Honorary Auditor, and continuously on many of the technical committees of the Institution, including the Advisory Committee on Research, the Research Executive Committee, Gasholder Committee, Meters Committee and Pipes Committee. Until recently Mr. Madden represented the Institution on the Joint Coordinating Committee of the National Organizations. He was also a member of the Institution of Civil Engineers and of the Institution of Mechanical Engineers, and has been Chairman of the South Wales Branch of the latter body.

In 1939 he was the Chairman of the Executive Committee of the British Commercial Gas Association, and he was President on no fewer than three occasions of the Wales and Monmouthshire Association of Gas Engineers and Managers. He was, in addition, a member of the Executive Committee of the National Gas Council and Chairman of the South Wales District Board of that body. From 1929 to 1933 he was a member of the Fuel Research Board and was, in November last, appointed Honorary Gas Engineering Adviser to the Regional Commissioner for Wales.

Gifted with mental powers of a high order, he was a master of the technical side of his profession, and the Grangetown Works at Cardiff are a monument to his skill in this regard. As an expert in gas engineering he had few equals, and his reputation as such extended far beyond the limits of the British Isles. He possessed conspicuous administrative ability, and his careful and sound judgment constituted him a most reliable guide upon matters of general policy. His mind was ever alert and receptive of new and advantageous ideas, as was shown by the prompt and continuous support he gave to all proposals which had for their aim the advancement of the Gas Industry and the popularization and extension of the use of gas, especially for industrial purposes.

He came to Cardiff at the time of the foundation of the Wales and Monmouthshire Association, and the present vigorous condition of that body is in great part due to the unfailing interest he took in it and the unceasing support he extended to it. He gave the fullest encouragement to the younger men engaged in the Industry, and when a Junior Association was established he did all that lay in his power to foster its progress. He very early realized that the future of the Industry depended upon the younger generation, and was ever a strong advocate of the establishment of a high standard of education for all those entering its technical side. Strongly holding this conviction, he took an active and enthusiastic part in the establishment of the Education Scheme of The Institution of Gas Engineers, and much of its subsequent success is due to his earnest collaboration in its establishment upon sound principles. He was a strong upholder of the worthy traditions and prestige of the engineering profession, and his name appears as President on the Petition for the Royal Charter granted to the Institution by His Majesty the King in 1929.

In this brief memoir it is not possible to give a complete list of the professional honours so deservedly conferred upon him, all of which he bore with the unassuming modesty which was characteristic of him. Nor did he look upon these positions as merely honorary, for he put his heart and all his energy into everything he undertook. He served the Cardiff Gas Light and Coke Company with a wholehearted devotion and loyalty which is beyond all praise, and he never accepted any position, the duties attached to which he did not scrupulously and thoroughly carry out.

In every relation of life he extended to all, whatever their position, equal courtesy, and was ever considerate of their feelings. His nature was most genial, he possessed a keen sense of humour and, up to the end, in his moments of leisure displayed a youthful lightheartedness most delightful to all who came in contact with him. At the same time, however, he was prepared to fight strenuously for what he considered right and just and was inflexible in matters of principle. To all who were perplexed by harassing problems and difficulties he was ever prepared to afford assistance coupled with sound advice, and many of us will cherish grateful memories of the help so willingly and cheerfully rendered. As a friend he was faitl ful generous, and, above all, loyal.

Early in the present year, during one of the severe air raids made upon Cardiff, he went out, as was his invariable practice, to direct the measures necessary in such emergencies and, as the result of exposure to the intense cold for many hours, contracted a severe chill. He was confined to his house for a time, but his high sense of duty was such that he felt it incumbent upon him to return to his post without taking the rest so needful for his recovery. It was evident to his friends that, although he retained his wonted courage, he was still suffering severely from the effects of his devotion to duty, but none of us realized that the "fell sergeant" was about to lay his hand on him. Some three months later he retired and we all hoped that he was about to enjoy a well earned period of rest and leisure. It was not to be. He had hardly relinquished the reins of office when he was overtaken by the illness to which he succumbed. We may rightly honour him as one who gave his life for the country he loved and the Company which he served so devotedly to the end.

The deep and sincere sympathy of all who knew him will be extended to Mrs. Madden and the family, to whom he was such a devoted husband, father, and grandfather.

He lies in the churchyard of St. Augustine's Church, Penarth, on the summit of a lofty headland commanding a view of the Severn Sea, the hills of Somerset among which he had hoped to pass his remaining days, the city of Cardiff where he spent so many active and fruitful years, and the Grangetown Works upon which he expended so much skill and energy. Standing by his open grave that sunny afternoon one could not but recall those lines of Tennyson so apposite to the place and the occasion:

> "And the stately ships go on,
> To their haven under the hill;
> But, O, for the touch of a vanish'd hand,
> And the sound of a voice that is still!"

Registration Problems

Builders and civil engineering contractors, including gas undertakings and gas plant constructors, who have not already registered under the Ministry of Works scheme should do so without delay. Registration certificates or acknowledgments of registration forms will be despatched by the Ministry by Oct. 1. The scheme is not concerned with offering employment to workmen, and individuals need register only if they are in business on their own account. If war conditions have caused a temporary closure of a business, application for registration should still be made, and a provisional certificate will be issued with directions as to procedure on resumption of business. Where a firm is engaged partly on producing goods for sale and partly on the installation of its products, it should register in respect of activities necessary for the installation of integral parts of buildings or structures. Firms solely engaged in fitting equipment which does not become an integral part of the structure should not register. Owners of small building businesses have in some cases gained an impression that registration implies a threat to the small man. This, of course, is not the case. The purpose of registration is to survey the capacity of the building industry as a whole, and implies no threat to anyone.

Anti-Flooding Device for Meters

We are advised by Messrs. Thomas Thorp & Co., Ltd., Scientific Apparatus Manufacturers, Victoria Works, Whitefield, Manchester, that they have acquired the sole manufacturing rights in connexion with a special float-operated valve to prevent the flooding of meters and consumers' fittings if gas and water mains are simultaneously damaged by enemy action, with consequent flooding of the gas mains.

The anti-flooding device is fitted between the stop valve and the inlet of the meter, thus preventing water from entering the meter and outlet services, It is available for vertical or horizontal fitting, in sizes to suit 2 in. to 6 in. pipes, and is neat and compact in design.

Further particulars can be obtained on application to the manufacturers.

A Meeting of the Members of the Institute of Fuel will be held in the Connaught Rooms, Great Queen Street, Kingsway, W.C. 2, on Wednesday, Oct. 15, at 2.30 p.m., when Lt.-Col. Sir John Greenly, K.C.M.G., C.B.E., will install Mr. W. M. Selvey, Wh.Sc., A.R.C.Sc., M.Inst.C.E., M.I.Mech.E., M.I.E.E., as President of the Institute for the coming year. After the installation, Mr. Selvey will give his Presidential Address entitled: "The Hundred Thousand: An Engineer's Philosophy." During the meeting the Melchett Medal for 1941 will be presented by the President to Dr. Clarence A. Seyler, D.Sc., F.I.C., who will, after the incoming President has delivered his Address, present the Melchett Lecture, entitled "Recent Progress in Coal Petrology."

The Next Meeting of the Gas Education Executive Committee of The Institution of Gas Engineers will be held at 1, Grosvenor Place, London, S.W. 1, on Tuesday, Oct. 21, at 2.15 p.m., instead of on Tuesday, Oct. 14, as previously arranged.

WALES AND MONMOUTHSHIRE ASSOCIATION

CONSIDER PLANNING FOR THE FUTURE

MEMBERS of the Wales and Monmouthshire Association of Gas Engineers and Managers assembled in good numbers and in good form in the Park Hotel, Cardiff, on Thursday, Sept. 18, for their autumn general meeting. The morning session was devoted to business matters relating to the Association; and then, after an interval for luncheon in the hotel, a lengthy afternoon session was fully taken up by a discussion of four of the papers presented at the June meeting of The Institution of Gas Engineers.

Mr. R. L. ASPINALL, of Barry (the outgoing President), on taking the Chair, referred to the great loss which the Association and the Industry had sustained through the lamented death of Mr. Madden. The present strong position of the Association was, he said, in no small measure due to the ever willing work done by Mr. Madden on its behalf. Those who wanted special help of any kind went to him, and one of his great characteristics was his desire at all times to assist and encourage the junior members of the profession, and those who were anxious to join it. He had been three times President of the Association, and to all of them the loss was a personal one, for he had at heart the interests of every member. The Secretary would convey their deep sympathy to Mrs. Madden and the family, and he would ask the members to rise as a tribute to the memory of a true friend, counsellor, and colleague.

They were greatly honoured to have with them as a guest the President of the Parent Institution, Sir Frederick J. West, C.B.E.—a strong man who would leave the stamp of his personality on the Industry when he vacated the Chair. He would also like to offer a word of welcome to the Deputy Chairman of the Gas, Water, and Electricity Department at Barry, Alderman C. B. Griffiths. For over thirty years he was Chairman of the Committee, and had done good work for the Gas Industry.

Sir FREDERICK WEST, being called upon, remarked that he would just like to say how pleased he was to be present at the meeting, and to extend to the members the good wishes and cordial greetings of the Parent Institution. He would express the hope that, with the loyal co-operation of the various district associations, it might be found possible to solve some of the difficult problems that lay ahead.

New Members and Associate

Moved by Mr. SNELLING, and seconded by Mr. BOARDMAN, the following were elected to the Association:

Members.—Stanley G. Meade (Newport) and Ivor W. Thomas (Neath).

Associate Member.—L. Mandy (Bristol).

Mr. J. F. RUST (Newport), the new President, then took the Chair, and, as his first pleasing duty, proposed a hearty vote of thanks to Mr. Aspinall for the work he had done for the Association during the past year, and presented him with a silver salver as a memento of his term of office.

Mr. ASPINALL, acknowledging the gift, said he had looked forward to a visit by the Association to Barry during his year, but he hoped this was merely a pleasure deferred.

The HON. SECRETARY (Mr. E. M. Edwards, of Port Talbot), explained that, consequent upon the changes in Secretaryship, the accounts had been allowed to stand over for two years ended March 31 last, and those of the Special Purposes Section to Sept. 30 last year. They were now available for audit, and the suggestion was that immediately this had been done they should be circulated to the members. At the September meeting of the Association it was usual to submit the report of the Special Purposes Section, but during the past year the chief work had been in connexion with the proposed new Coke Association for that area, and the suggestion had been made that the report could best be dealt with upon the completion of this matter.

As members might desire information upon the subject of the Gas Research Board, this matter had been placed upon the agenda, and Mr. Edwards read an explanatory letter from the Secretary of The Institution of Gas Engineers, which had been drafted by Dr. Braunholtz to clear up points that might arise in the minds of members. It was pointed out by Mr. Edwards that Dr. Diamond, the Assistant Secretary, was present at the meeting, and would be pleased to deal still further with the subject if members wished.

The PRESIDENT drew attention to the formation of a South Wales Branch of the Illuminating Engineering Society, and stressed the necessity for the Gas Industry to be represented adequately in organizations of this character.

Mr. R. J. AUCKLAND said that the first meeting of the winter would, he understood, be held in Cardiff almost immediately, and it promised to be very interesting.

The PRESIDENT remarked that, in a letter of congratulation, Major Julian Day, who was Chairman of the Severn Valley Gas Corporation, and of his own Company, hoped that the meeting next spring might be held at Newport, but as things were so unsettled, it would be better that the arrangements should be left to the Council.

Mr. W. CLARK JACKSON said he felt this was an opportune time for the members to ask the Council to give consideration to some permanent memorial within the Association as a lasting remembrance of their late greatly esteemed friend, Mr. Madden, and he moved that the matter be referred to the Council.

Mr. W. T. KENSHOLE seconded this, and it was agreed to.

The PRESIDENT next, on behalf of the Association, congratulated two members who had received awards for gallantry in civil defence work. They were Mr. G. E. Childs, Deputy Gas and Water Engineer, Barry, and Mr. Darrell W. Rees, Pembroke.

Mr. J. H. CANNING said there was a matter which he had brought before the Council recently, and which they wished him to put to the members, so that they might think it over. When they lost Mr. Octavius Thomas, it was decided to do what Mr. Jackson had so rightly proposed with respect to Mr. Madden—namely, establish a permanent memorial. It was originally decided that the interest on the sum of £300 subscribed should be devoted in the first place to an annual contribution to the Benevolent Fund of The Institution of Gas Engineers, and in the second place to the provision of prizes for the Juniors. It had occurred to him that probably the best way of accomplishing this would be by handing over a certain portion of the capital to the Benevolent Fund to be held by them in trust. Would this be the best method of dealing with the fund, or would the members prefer that it should remain, as at present, in the hands of Trustees in their own district, who would continue to deal with the interest?

It was agreed that the matter should be placed on the agenda for the next meeting.

Good Government

Sir FREDERICK WEST, at the subsequent luncheon (in which no fewer than eighty members and friends participated), proposed "The City and Trade of Cardiff," approaching his subject from the point of view of the right relationship that should subsist between a community and its local government. He said that sufficient consideration or appreciation was not given to the voluntary services of those responsible for local government. Speaking with an experience of many years of local government work, he had come to the definite conclusion that there was no form of government, national or local, which was superior to that of this country. He was not suggesting that our local government could not be improved; in many places party politics played too prominent a part. A town would prosper if the community took a proper interest in local affairs and gave adequate encouragement to their representatives in the voluntary work that they undertook. Unless there existed a cordial relationship between the commercial interests of a city and those responsible for its government, there would be danger; close relationship between the two was necessary for progress.

Alderman C. H. M. COLE, Lord Mayor of Cardiff, responding, declared that the close association just referred to had been responsible for the great development of the City of Cardiff. They could not do without the Gas Industry in Cardiff.

"The Industry and the Association" was submitted by Mr. BERTRAND TURNBULL, Deputy-Chairman of the Cardiff Gas Light and Coke Company, who remarked that Mr. Rust must feel proud to succeed such men as Mr. Octavius Thomas and Mr. Madden, who had lived for the Gas Industry both in South Wales and outside it.

The PRESIDENT, in his reply, acknowledged the indebtedness of the Association to the Cardiff Gas Company, who at all times extended to the members every help and encouragement. He said that the whole of his life had been devoted to the Gas Industry, under Mr. Herbert Canning and his father, the late Alderman Thomas Canning. Their Association had been the first to award prizes to encourage the Juniors, and these awards would be continued.

D.C.V. Standardization

In the afternoon the meeting was resumed for the purpose of discussing four of the short papers presented at the June meeting of The Institution of Gas Engineers. These were: Sir Frederick West's paper on "The Standardization of Calorific Value," opened by Mr. W. H. Johns; "Sulphur Reduction as a Future Requirement in Town Gas," by Dr. Harold Hartley, opened by Mr. L. J. Kleist; Mr. R. J. Rogers' paper on "Standardization of Consumers' Appliances as a Post-War Policy," opened by Mr. B. J. Bell; and that by Col. W. Moncrieff Carr, on the "Future Grouping of Gas Undertakings," opened by Mr. W. T. Kenshole. The first three of these papers have since the June meeting been referred by the Institution to Committees.

Mr. W. H. JOHNS (Swansea) said that reasons for the standardization of calorific values had been discussed and generally agreed upon for many years past; but, like so many other reforms, it had taken a war to bring them to a full realization of the importance of the subject and to the need of finally deciding what they intended to do. Prior to a decision upon the declaration of value, many factors had to be taken into account. Declarations were affected by the type of carbonizing plant available, by the quality of the coal obtainable, and by storage and distribution problems; and accordingly he fully agreed with Sir Frederick West in his statement that, despite all other considerations, freedom of choice as to the declaration of values should continue to remain vested with the undertakings. At the same time, he also agreed with the author in his view that there definitely existed the need for some degree of uniformity—particularly in view of the extended use of gas, not only for domestic, but also for semi-industrial and for industrial processes; and therefore, while it was admitted that a certain amount of elasticity must remain, it was to be hoped that those undertakings which at the moment could not

see their way clear to fall into line would without delay proceed to "put their house in order," so that in the very near future they might be able to fall in with the majority.

Of the total of 703 undertakings referred to in Sir Frederick's summary of declarations of calorific value, 219 were supplying gas at 500 B.Th.U., 74 at 475 B.Th.U., 157 at 450 B.Th.U., and 34 at 425 B.Th.U. Disregarding the aggregate quantities supplied, these figures represented approximately 70% of the total, which was a definite indication that such values had been found in practice to comprise qualities which had proved economical, and that within the range which they covered all requirements might be satisfied. In the light of these figures, it was difficult to understand the reason for 26 different declarations, ranging from 200 to 600 B.Th.U.

Figures within the Association Area

Considering the matter from the viewpoint of the undertakings operating within the area of their own Association, Mr. Johns said that he had compiled a list from the latest figures available, and copies of this were handed round to the members. Of the 61 undertakings included, calorific values were given in 52 cases, and from the figures he had been able to deduce (again disregarding aggregate outputs) that only three undertakings, or less than 6% of the total, were supplying gas below the minimum value of 425 B.Th.U mentioned by Sir Frederick; and that only one undertaking, equivalent to less than 2% of those whose calorific values were shown, was supplying at a figure exceeding the suggested maximum of 500 B.Th.U. About 92% of the undertakings supplied gas within the limits of 425 and 500 B.Th.U., while no less than 57.7% were supplying at either 450, 475, or 500 B.Th.U., and 69.23% between 450 and 500 B.Th.U. This statement, in which he had also shown the relative carbonizing plant or source of production, prompted him to submit that, as far as their own district was concerned, there should be no dissension from a policy providing for standardization within the suggested range. It was hardly necessary for him to dwell upon the advantages that would accrue from a standardization policy adopted nationally; but he would impress upon the meeting the fact that, not only would it effect economies in the cost of gas production, of meters (with the possibility of meters registering in therms), and of gas utilization equipment, but that this cheapening of first cost would bring the appliances within the purchasing power of a greater number of consumers, with the ultimate effect of extending the use of their main product. All would stand to benefit—the manufacturer of gas-producing plant, the meter manufacturer, the maker of gas-consuming appliances, the undertaking, and the gas-consuming public.

Mr. Johns quoted from the written contribution by Mr. T. C. Finlayson to the dicussion on the paper at the June meeting the statement that, "if the Industry could face the future with (say) four calorific values, a substantial step would have been taken in meeting future difficulties"; and he concluded his opening by saying: "In a discussion on a paper on the same subject presented by Mr. E. G. Stewart in 1937, Mr. Finlayson expressed the view that the trend was towards declared values of 450, 475, and 500 B.Th.U.—a statement supported by P.E.P. in their Report upon the Gas Industry, when they stated that in their opinion three values should suffice. I further recollect that in Mr. Stewart's paper emphasis was laid on the fact that gas of 500 B.Th.U. represented 39% of the sales in this country, that gas of 470–480 B.Th.U. covered 28% of the sales, and that 21% was represented by gas of 450–460 B.Th.U. He stated also that only 4% of the total sales was accounted for by gas below 450 B.Th.U. Finally, I would direct attention to the Editorial Notes in the 'Gas Journal' for June 25 last, wherein I was interested to read that four well known authorities in the Industry had suggested that three declared calorific values (500, 475, and 450 B.Th.U.) should suffice to meet all the requirements of the different conditions experienced in this country. To these it will be noted that Sir Frederick West has added a fourth (425 B.Th.U.), and since I concur in the view that the four—possibly even three—should suffice for all demands, I submit that the need for standardization is long overdue, and that it is high time that the Gas Industry decided this important question once and for all."

Mr. E. M. Edwards (Port Talbot) said he thought the four standards suggested were quite sufficient. Ultimately the Industry should be able to supply a uniform standard, though at present he did not see that it was possible. There were, of course, many matters that affected the question; but it seemed to him that the essential thing was, not so much whether they should have three or four declarations altogether, but that they should have one declaration in a particular area. Without this, linking-up neighbouring supplies was not likely to be very satisfactory. Coals and gas-making plants had a great influence, but taking the long view he saw no reason why eventually one standard should not be adopted, and in the meantime he thought that the four values suggested should cover the requirements of the whole of the South Wales area.

Mr. F. Boardman (Cardiff) said he agreed with what Mr. Johns had stated regarding this question of calorific value, and also with the four figures suggested in Sir Frederick West's paper. But in declaring the calorific value did they cover everything? Any alteration in the carbonizing arrangements by which the composition of the gas was changed would have an effect upon the appliances; although the calorific value remained the same, the flame temperature would be altered. It was the flame temperature that mattered. Would the standardization of calorific value involve them in the standardizing of carbonizing plants in the future?

Sir Frederick West remarked that Mr. Boardman had raised a point which required some elucidation. The Institution Council, in deciding to appoint these Committees of Inquiry, drew up their terms of reference, and in connexion with this particular question the terms had been widened. The Council had decided that the terms of reference to the Committee on this subject should be to inquire into, and to make recommendations upon, the most useful quality of gas from all aspects for supply to consumers in Great Britain. So the point raised by the last speaker could be fully dealt with by the Committee.

Mr. S. G. Meade (Newport) said he could not regard the standardization of calorific value without thinking in terms of many other factors, some of which he felt were even more important than the calorific value itself. This point could best be illustrated by considering the various different methods available for making gas to conform to this standard thermal value. The physical and chemical properties of the gases resulting from these various carbonizing methods would greatly vary. He remembered a certain piece of apparatus for taking spot tests for calorific value which gave readings that would vary some 20 B.Th.U., even with a gas of constant calorific value, but with varying composition, and hence physical properties. This to a large extent represented what was happening to the various assortments of domestic apparatus.

Mr. Ernest Ablett (Swansea) emphasized the point that the problems of this paper were very closely linked with the question of grouping. When this grouping did occur, such questions would to a great extent automatically solve themselves.

Mr. W. Clark Jackson (Neath) said that, generally speaking, undertakings in South Wales which had a declared value of 500 B.Th.U. were using North Wales or Yorkshire coals. South Wales coals were in an altogether different category, and this was responsible for lower calorific values which were found in the district.

Planning

Mr. R. J. Auckland (Cardiff) said he did feel that they were discussing in war times problems which related to the future. He did not know that they were going to serve much purpose at the moment, except that it might be of great advantage to the Committees who were considering these problems to have the opinions of the members. The great thing at the moment was planning. It appeared to him that the progress they had been making in the Industry was relatively small, and it has needed a war to wake them up to the real position. After all, it was not the single problem of calorific value or flame temperature, or any of the other topics raised, which was of prime importance, but how they were going to face the future. He hoped they were going to regard these matters from the point of view of how they were intending to face the competition of the days to come. In some industries out-of-date methods had been wiped away by the fierce heat of competition, but apparently the heat of competition in their own Industry had never yet been sufficiently fierce for them to realize that, if they were to maintain themselves as an industry, they must set up suitable standards—in gas supply, in working, and in each of the subjects they were discussing that afternoon. He hoped, therefore, they would consider questions in their widest sense. They had not, he thought, yet learned the lessons of the past. It was the exigencies of the last war that brought about the National Gas Council, but even now, in this war, there was a very obvious feeling that there was a need for the re-planning of the whole Industry. They would have to face intense competition after this war. Were they preparing themselves for that? Were they still going on making gas suited to their local needs, or were they going to aim at something like standardization, so that they would be able to say that what they were selling was suitable for most of the conditions under which it was to be used? They needed to look at this question of planning for the future as a whole.

Mr. Johns said he thought the Committee in London were seeking a lead, and his idea had been, if possible, to be helpful as an Association to those gentlemen who had been called upon to take up this important piece of work for the Industry. He had left out the question raised by Mr. Boardman, because he was speaking to the title of the paper. If they could settle that point, the other matters would follow in due course. He hoped they could say that the figures suggested by Sir Frederick West would be agreeable to them.

Sulphur Reduction in Town Gas

Mr. L. J. Kleist (Cardiff), opening the discussion on the subject of "Sulphur Reduction as a Future Requirement in Town Gas," said the first point which struck him was that, while the removal of sulphuretted hydrogen to the fine limit of less than 2 parts per million had been a necessity to meet the requirements of the Gas Undertakings Acts for many years past, organic sulphur to the extent of 20 to 40 grains per 100 cu.ft. had continued to be distributed by gas undertakings. These organic sulphur compounds were said generally to consist of approximately 80% carbon bisulphide and the remaining 20% mainly thiophene, a compound invariably associated with benzene. So far as his own experience went, these percentages also held good for Welsh coals with the types of carbonizing plant in use at Grangetown.

Reckoning all the organic sulphur compounds to be present as carbon bisulphide, and calculating to parts per million, it would be found that 20 grains per 100 cu.ft. was equivalent to approximately 130 parts per million. Since carbon bisulphide and sulphuretted hydrogen on combustion produced approximately the same quantity of sulphur dioxide, weight for weight, why was it considered necessary to remove one impurity so completely—namely, down to under 2

parts per million—and leave the other in the gas to the extent of over 100 parts? Doubtless the answer, in the past, was to be found in the ease with which sulphuretted hydrogen could be removed by oxide purification.

To-day one must look to one or more of the various chemical processes now in use, or in course of development in the years immediately preceding the present war, to bring about the reduction necessary. In order of their development there was the nickel catalytic process of the South Metropolitan Gas Company, and then the processes of the Gas Light and Coke Company which were developments of benzole recovery. The latest development—and to his mind the one offering the greatest possibility in the future, at least in the case of the larger producing plants—though so far as he knew very little information regarding the commercial success of the process was yet available—consisted of the catalytic oxidation by nickel sulphide at only moderate temperatures of the carbon bisulphide. It differed from the older process of the South Metropolitan Company, where sulphuretted hydrogen was the final product of catalysis, in that sulphur dioxide was produced which could be easily removed by washing. Furthermore, the unit required was said to be remarkably small, nitric oxide was eliminated, and oxygen was used up and thus removed from the gas. It seemed possible by means of this process alone to reduce the organic sulphur down to about 4 grains, and, when followed by benzole recovery, to a still smaller figure. He noted that Dr. Hartley in his paper drew attention to the fact that reduction to 10 grains was insufficient, having in mind mainly the question of flueless heating; and this statement undoubtedly foreshadowed the necessity for some process similar to the one last mentioned.

During the past ten to fifteen years, the organic sulphur content of Cardiff gas had shown a gradual reduction, and at present was certainly less than 20 grains per 100 cu.ft. This reduction, he thought, had been brought about mainly by changes in the coals carbonized, the making of a greater percentage of vertical retort gas, and heavier charges in the horizontals. Even if sulphur was eliminated, they would still have to consider other corroding agents formed during combustion which for obvious reasons it was impossible to eliminate. It had also to be remembered that nitric oxide could be formed in the products of combustion to approximately the same concentration as sulphur dioxide, and was capable of producing nitric acid which, especially in conjunction with sulphuric acid, became a very active corroding agent. While corrosion of appliances would undoubtedly be reduced and maintenance costs lowered if lower total sulphur content gas became generally practised, it seemed doubtful whether either it, nitrogen compounds, carbon dioxide, or water vapour could be completely eliminated; so that the problem, so far as the manufacture of appliances was concerned, must of necessity be examined in conjunction with the utilization of corrosion-resisting materials.

It would have been gathered from his remarks that he considered it most desirable, and certainly possible, that at least some reduction of sulphur compounds should be brought about, and this, he hoped, in the near future. Those undertakings which were recovering benzole, or were contemplating recovery, were certainly in a position to do something towards this very desirable end.

Service and Impurities

Mr. W. CLARK JACKSON (Neath) declared that in the whole of his lifetime he had never sold a gas appliance; he had always sold service, and when they did this they began to appreciate the difficulties they were up against in regard to these impurities. He believed that in connexion with water heating—a load to which they ought to look forward in the future—they would be compelled to remove sulphur from the gas. He was all out for sulphur removal; as to which was the best method he was not sure. The small amount of washing in a modified benzole extraction plant had helped his sulphur content figure considerably, and had improved his maintenance costs and charges. A start towards the removal of sulphur was by using properly washed coal.

Mr. E. M. EDWARDS (Port Talbot) said he was in full agreement with Mr. Jackson that, if they wished to develop the water heating business, it would be necessary to aim at the complete elimination of sulphur. Benzole extraction was a help, but what they really wanted to know was the most efficient and cheapest method of removing sulphur completely. Removal down to 10 grains was not sufficient.

The PRESIDENT remarked that the general opinion of the meeting seemed to be that the total abolition of sulphur was a most desirable thing, and therefore they would be deeply interested in the researches of the Institution to ascertain the best and cheapest means of attaining this end.

(Our report of the discussions upon the standardization of consumers' appliances and the future grouping of gas undertakings is reserved for a subsequent issue.)

THE AIMS AND FUNCTIONS OF PUBLICITY

1. INTRODUCTORY THOUGHTS ON ADVERTISING

This is the first of a series of articles on various aspects of publicity specially contributed to the "Gas Journal" by the British Commercial Gas Association. In the work of ensuring for gas its rightful position in the post-war world, publicity on the right lines will undoubtedly be of great value. It is hoped that this series of articles will stimulate thought and open up new ideas on this important subject.

AN advertising manager who had been unconscious in the manner of Rip Van Winkle for the last two years might well be startled out of his senses again when his eyes fell on some of the advertisements which are appearing at present. Among other adventures in the unexpected, he would find himself spelling over announcements by the cigarette makers inviting their customers to smoke fewer cigarettes, and offering helpful suggestions as to how this can most painlessly be done. Gone are the days of "Players Please." Now, "Eight instead of 10, Sixteen instead of 20," runs the prose of persuasion. So on to the ultimate development, "Use less Brylcreem," in bold arresting letters. The returned student might reflect that there was a time when a man who suggested such a headline to a manufacturer would have been put under observation.

Salesmanship in Reverse

At first glance, much advertising to-day looks like salesmanship in reverse going very fast, but there is more to it than that. Plainly, the cigarette makers are not embarking on a long-term policy to cut their turnover by 20%. The makers of Brylcreem are not giving explicit directions for squeezing the last drop out of the bottle with a view to selling fewer bottles from year to year. But both parties, faced with a demand greater than they can supply, not only have to drop attempts to stimulate immediate sales, but must take such steps as they can to protect their goodwill. No company wishes to have disgruntled customers muttering because they cannot get supplies, discovering that they can do without the product, or experimenting with substitutes. The present state of advertising, which we must hope is abnormal, throws aspects into higher relief, and, when ordinary selling advertising is almost historical, is a good time for academic consideration.

Advertisement for Identification

Good advertising is usually simple in form, but all its purposes are not always obvious. The objects of some forms of advertising are, of course, quite plain. The earliest common advertisements were for identification. A tradesman would put up a sign stating his name and trade; in mediaeval England, innkeepers would hang up a holly-bush outside their premises. These devices let people know where to get what they wanted; hard selling and competitive advertising came later. Identification is, of course, very important and has a rudimentary relation to distribution—that it should be easy for customers to obtain the product is fundamental to all marketing, and if it is not, advertising schemes are crippled in advance.

Plain selling advertisements are easy to follow. The simplest of them are mail order advertisements of sales in shops. These call for instant action; they list the goods, state the inducements to buy bold and clear, and often add some such call to action as, "Don't miss this Wonderful Opportunity." Ordinary selling advertisements are easy to recognize and call for no comment here; whether they are well or badly done is not the subject of this article.

The Importance of Goodwill

More direct types of advertising are needed, particularly by public utilities such as the Gas Industry. Goodwill is of the highest importance to them. In America, public utility companies are held in the deepest odium, and it will be remembered that Mr. Wendel Wilkie was thought to have been heavily handicapped in his attempt to become President by his business connexion with public utilities. In Britain, feeling is not so strong, but anything which humanizes a great industry and makes consumers feel friendly towards it is worth a great deal, even if no actual cash transactions can ever be traced directly to it.

There are also often better ways of selling services than by a direct approach. If the number of people who bath daily were to be doubled, or if all the people who have no baths were provided with them, clearly a great deal more fuel would be sold for heating water. (This is still an academic discussion and has nothing to do with present conditions.) To change the habits of a large section of the nation is a severe task, but it can be done; the growth of hiking and the consequent sale of more railway tickets is an instance. A successful campaign of this sort would obviously outweigh the results of many schemes of day-to-day advertising.

(*Continued on p. 479*)

Of course no amount of advertising can build up goodwill permanently for a concern that does not deserve it. To announce that a company gave good and friendly service when it was really curmudgeonly and inefficient would simply enrage the people. The force of a genial character like Mr. Therm, and a slogan such as, "Gas never lets London down," was that they represented truths. Their special value is that they made the truth vivid to people who were dimly aware of it.

Gas advertising must, of course, stress the advantages of gas and gas appliances in a perfectly direct way. However, prestige, goodwill and background are so important that some of the Industry's most successful pieces of publicity never mention gas at all. The films on housing are an instance of this.

Publicity with a long-term policy often calls for a great deal of faith and patience. And it is always necessary to understand what it is driving at.

THE U.G.I. GUM FILTER AND ITS EFFECT ON SERVICE*

By C. C. WINTERSTEIN and H. D. LEHMAN

A LITTLE more than ten years ago the manufactured gas industry faced a serious situation involving the rapid stoppage of gas appliance control equipment by a resin or gum-like deposit. The precise nature of that deposit and more especially the cause of its formation proved a very baffling question but finally, after several years of intensive research, the story was unfolded.

For the needs of this Paper† it will suffice to touch only lightly on that story. It has been presented in detail before. Our main purpose here is to discuss a successful remedial measure in the form of a filter for the interception of gum before it reaches the control equipment and to present some field data on the results that have been obtained by it.

It has early been established that gum existed in the gas as a solid in the form of spherical particles of microscopic size in the "suspensoid" state. These particles were known to be finer than those of tobacco smoke.

Nitric oxide (NO) which appears in the gas at the source of generation, whether water gas sets, coal retorts or coke ovens, is the cause of gum formation. The amount of nitric oxide in these manufactured gases is very small, ranging from practically zero to several grains per 100 cu.ft. It was once believed that if nitric oxide was held to not over one part in thirty-five million parts of gas, the quantity of gum formed would be negligible. This conclusion was later discarded when it was established that the gas would have to be "essentially free" of nitric oxide if all objectionable gum formation is to be avoided.

The nitric oxide is oxidized in the gas to nitrogen peroxide and this reacts with certain hydrocarbons in the gas to form the gum particles. These particles range in size from molecular dimensions when first formed to a size that results in them dropping out by gravity. The smaller particles remain suspended in the gas and pass along through the system. The formation of gum particles is not an instantaneous reaction but is believed to proceed slowly up to a maximum amount after a few hours. Hence gum may form anywhere in the system, even at the appliance.

Growth of Molecular Particles

The molecular particles, as first formed, grow with age due to coalescence. As the larger particles are formed and drop out, the opportunities for the smaller ones to coalesce are diminished. Because of this and a progressively decreased rate of formation, some particles remain suspended for weeks in storage.

The number of gum particles is great, ranging from 20,000 to 100,000 per c.c., or a maximum of nearly 3,000,000,000 per cu.ft. in an ordinary gas giving objectionable but not excessive gum trouble.

The diameter of the smallest particle visible in an ultramicroscope is approximately 0.000008 in.

The diameter of the larger particles is between about 0.00004 to 0.00008 in.

The average diameter is about 0.00001 (one one-hundred thousandth) in. and at this size, without coalescence, it is estimated that about three months would be required for the particles to drop by gravity through a height of 100 ft. in perfectly still gas. Hence, they could never be expected to drop out of the gas before reaching the appliances since the "life" of the gas is ordinarily only a matter of several hours.

These figures for particle size may be compared to an approximate area of 0.00005 sq.in. for an annular opening of a needle adjustment passing about 0.2 cu.ft per hour at 4.5 in. pressure. It has further been estimated that the width of the annulus of needle adjustments on which experiments have been made is 0.00028 in. assuming it is truly concentric. Actually many needles give eccentric openings and the annulus may therefore taper in width from zero up. This increases the liability to gum stoppage although the true concentric ring itself is extremely susceptible to stoppage.

Gum particles striking the constricted openings lodge in them and soon build up to the point of causing a complete stoppage.

The actual quantity of vapour-phase gum is ordinarily small—of the order of 0.022 to 1.1 lb. per million cu.ft.

The amount of gum that will stop up a top burner pilot burner needle adjustment is in the neighbourhood of 0.0000003 to 0.0000007 oz.

Gum particles which pass on through the burner are consumed like any other combustible. Their only known harmful effect is obstructing constricted openings chiefly in pilot adjustments devices and the smaller graduated controls.

Parallel with comprehensive investigations under way to ascertain the cause of gum were other investigations to determine how to protect the appliance against it. The thought arose to filter out the gum particles and then followed innumerable experiments to find a practical material that would accomplish that purpose. It was no easy task.

It was recognized that the immediate needs demanded protection against constantly burning small control equipment—especially pilots. Hence, the development of the filter was pursued with pilots and small consuming appliances such as refrigerators and low recovery water heaters in mind. The objective was the provision of a filter that would be adequately compact and of nominal cost.

We shall pass over a detailed discussion of the various earlier types of filters and other gum protective devices that were developed in this experimental work. Some of those devices were produced in quantity and installed in the field. Depending on the design, they were in due time judged unfavourably for general distribution because of such factors as high cost, bulkiness, susceptibility to failure by dirt stoppage, low capacity, sealing difficultes, &c.

Finally the present type of filter was evolved. The design appears simple enough but, as you may have gathered, it was completed only after a tremendous amount of experimental work had been executed. To insure its performance, the selection of the right type of filtering material and its packing in the filter case has been necessary. This single phase of the problem alone has demanded an unusual expenditure of laboratory time and effort.

Having selected the correct filtering material and having provided the necessary instructions for its assembly within the casing, the work of the laboratory is thereafter extended to making check tests on random selected sample lots removed from production runs. Initially 100 filters are taken from the first 1,000 filters produced. Thereafter 10 filters out of every 1,000 production are tested both for capacity and gum removing performance.

Laboratory Tests

A careful check of the gum removing performance of the filters is made by the laboratory. For this purpose a special apparatus using a specially prepared aged gas is used. This apparatus permits the determination of the passage of the most minute particles of gum and if any gum passage is revealed the filters are rejected. Fortunately there has been very little occasion for rejecting filters as the filter manufacturers have closely adhered to the specifications and have co-operated in every way to ensure a perfected product. The practice of the laboratory checking the filters has served to preclude the release of defective filters.

Besides routine testing of production filters the laboratory is also actively engaged in periodically checking the performance of filters in service. A number of such filters were pre-tested by the laboratory before being installed and are removed from time to time for re-test. The results have been highly satisfactory as no substantial reduction in capacity over as much as 3 years of service has been observed. This finding, combined with general field observations, leads to the belief that a much longer life than the originally estimated 8 or 10 years will be attained.

In addition to the primary purpose of the filter to remove gum it also serves to remove all dust and other foreign particles. This incidental advantage is contributing to the trouble-free performance obtained from filter protected equipment.

It is certainly no over-statement to say that the Gas Industry to-day, with its large number of pilots already on the lines and being installed in constantly increasing degree, is vitally concerned with the uninterrupted performance of pilots. Clearly, the countenancing of any condition which gives rise to a risk of pilot interruption is inviting near disaster so far as public acceptance of gas is concerned. Gum trouble is in this category. This fact has been unfortunately clearly proved in some situations where gum troubles reached proportions that gave rise to very critical situations.

Since the time when the cause and nature of gum depositions were identified, advances have been made in the control of the conditions giving rise to the gum trouble, but to the best of our knowledge the situation has not been so greatly bettered by plant control that precautions need no longer be observed by added protection at the appliances. In fact, no immediate solution for the complete elimination of gum formation appears at hand.

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* From the *American Gas Journal*.

† Certain of the data presented herein have been taken from the following three previously presented articles: "The Development of a Non-Stop Pilot Control," E. J. Brady, 1933; "Gum Deposits in Gas Distribution Systems," Jordan, Ward, and Fulweiler, 1934; "Robot Chemists," W. E. Stackhouse, 1939. Paper presented at the Operating Division, New England Gas Association, Worcester, Mass., May 7, 1941.

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Gas Products Prices

The London Market

Sept. 22.

There is no alteration in the prices of Coal Tar Products in the London market. Values remain to-day approximately as follows:

Pitch is nominal; creosote about 5d.; refined tar 3¾d. to 4d.; pure toluene under the Ministry of Supply Toluene No. 2 Order 2s. 5d.; pure benzole is 1s. 10d.; 95/160 solvent naphtha 2s. 5d. to 2s. 8d., and 90/160 pyridine 13s. 6d.; all per gallon naked; refined crystal naphthalene £23 per ton in bags; all *ex* Makers' Works.

The Provinces

Sept. 22.

The average prices of gas-works products during the week were: Pitch and Crude Tar,* Toluole, naked, North, 1s. 10d. (controlled by the Control of Toluene No. 2 Order, July 5, which fixes the maximum price at which this material may be sold). Coal tar, crude naphtha, in bulk, North, 11d. to 1s. Solvent naphtha, naked, North, 1s. 9d. to 1s. 10d. Heavy naphtha, North, 1s. 9d. to 1s. 10d. Creosote, *ex* works, in bulk, North, liquid and salty, 4¼d. to 4½d.; Scotland, 4¼d. to 4¾d.; low gravity, 4¼d. to 4¾d. Fuel Grade, 4d. to 4¼d. Carbolic acid, 60's, 3s. 7½d. to 3s. 9d. Naphthalene, £15 to £20. Salts, drained, £6 to £6 10s.; whizzed 72°, £7 15s.; 78°, £9 5s. Anthracene prices fixed by Controller. Heavy oil: Unfiltered anthracene oil (min. gr. 1,080), 6d. to 6½d.; filtered heavy oil (min. gr. 1,080), 6½d. to 7d.; heavy anthracene oil gr. less than 1,080, 5¾d. to 6d.

*In regard to pitch and crude tar prices we would ask readers to refer to the editorial note on p. 396 of the "JOURNAL" for Sept. 10.

Tar Products in Scotland

GLASGOW, Sept. 20.

New business continues difficult, but prices are well maintained.

Refined tar is in fair request with home price unchanged at 4¾d. to 5d. per gallon, while for export supplies are still available at round 3½d. per gallon, both f.o.r. naked.

Creosote oil of all grades is in good call at the following prices: Specification oil, 5¾d. to 6d. per gallon; low gravity, 6½d. to 7d. per gallon; neutral oil, 6d. to 6½d. per gallon; all *ex* Works in bulk.

Cresylic acid.—Supplies as available find a ready outlet with prices firm as under: Pale, 99/100%, 4s. to 4s. 3d. per gallon; Pale, 97/99%, 3s. 6d. to 3s. 9d. per gallon; Dark, 97 99%, 3s. 3d. to 3s. 6d. per gallon; all *ex* Works in buyers' packages.

Crude naphtha is quietly steady at 6½d. to 7½d. per gallon *ex* Works in bulk, according to quality.

Solvent naphtha.—90/160 grade is 1s. 8½d. to 1s. 9d. per gallon and 90/190 Heavy Naphtha is 1s. 4½d. to 1s. 5½d. per gallon.

Pyridines are still quiet at about 14s. per gallon for 90/160 grade and 16s. per gallon for 90/140 grade.

The Calorific Value of gas supplied by Edinburgh Gas Department is to be reduced from 475 to 450 B.Th.U.

Gas Stocks and Shares

The news from Russia led to hesitation and uncertainty in most sections of the Stock Exchange last week, and severe setbacks occurred in the prices of those stocks and shares recently the centre of speculative activity. There was less support towards the end of the week for British Funds, but the earlier gains were mostly held and 2½% Consols closed 1 point higher at 82½. Leading industrials maintained a steady appearance although here and there a few fractional losses were noticed. Rubber and tea shares remained steady, but oils fluctuated in accordance with the demand. The former speculative activity in the mining market died down and some heavy falls took place.

Although the Gas Market was by no means idle last week buying was not so widespread, and was confined for the most part to the stocks and shares of the larger undertakings. Gas Light units gained a further 3d. to 13s. 9d., and some demand for Cardiff Ordinary took the price up 4 points to 92½. Elsewhere there were no special features.

The report and accounts of the Alliance and Dublin Consumers' Gas Company show that in reducing the dividend for the half year to June, 1941, from 3½% (the rate paid a year ago) to 2½% the Directors have considerably strengthened the Company's financial position, £16,071 being added to the reserve fund and the carry forward increased to £7,203 against £3,333 brought in. The lower dividend has not affected the price of the Company's stock, which remains at 87½ *ex div.* The Directors of the British Gas Light Company, Ltd., have declared an interim dividend of 3% on the ordinary stock, the same rate as a year ago.

The following is a complete list of price changes in the Official List during the week:

OFFICIAL LIST

Alliance & Dublin Ord. (*x.d.*) ...	85—90	Sept. 15	
Cardiff Ord.	90—95	+4	
Croydon Sliding Scale	87—92	+2	
Gas Light & Coke Units	13/3—14/3	+-/3	
,, 3½ p.c. max. ...	49—54	−1	
,, 4 p.c. Pref. ...	65—70	+2	
South-Eastern Gas Corporation Ord.	11/6—13/6	+-/6	
South Suburban Ord.	61—66	+1	
United Kingdom Gas Corporation 4 p.c. 1st Red. Cum. Pref. ...	13/6—15/6	+-/6	

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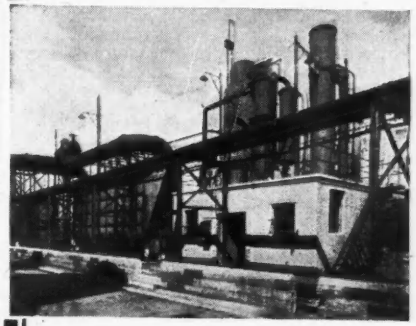

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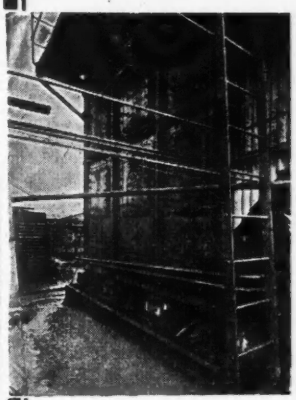

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It is also believed that the sudden appearance of gum in controls may result from other factors than the formation of gum in the gas from the time it leaves the works. In addition we may be so bold as to even include possible slip-ups in plant control which could result in gum epidemics of serious proportions.

The appearance of gum trouble therefore remains a major problem —one that can only be satisfactorily met or guarded against by the use of gum protective devices at the appliances.

Effect of Gum Filter on Service

So far as Philadelphia is concerned, the problems involved in vapour phase gum deposits were first and forcibly brought to our attention in the summer of 1930 by a proportionately substantial epidemic of stoppages on gas refrigerators. At the time of this experience, our greatest concern resulted from the customer-reaction which naturally developed from these interruptions of refrigeration. For it seemed to us then, and seems to us now, that even more important than the question of cost was, and is, the question of the naturally unfavourable reaction developing in the customers' minds and the not unnatural inclination going with it to consider competitive sources of energy.

With the development of an effective and practical gum filter, it is now possible completely to eliminate this source of irritation to customers and potential loss of load—certainly to the extent that it is possible to have filters installed.

Second only, in our judgment, to the question of effect on customers and on the gas load is the effect of the increased service calls on servicing costs. With the development and general use of automatic appliances, the interruption of pilot and small flows has been one of the most important, if not the most important single item contributing to increased servicing costs. Obviously, therefore, the development and use of a device such as the gum filter, which materially reduces such calls, and therefore such costs, is of maximum importance from this standpoint. In Philadelphia, this fiscal year—ending Aug. 31, 1941 —based on results to date, our total servicing costs will be considerably less than 4 years ago, despite the addition to our lines of approximately 26,500 refrigerators, 120,000 fully or partially automatic ranges, several thousand automatic water heaters, and 1,600 house heaters, and despite increase in substantially all of the items that go to make up the charges to these accounts.

It would not be correct to say that all this very marked improvement is due to the adoption of a filter. In our judgment, however, it is quite fair to say that the principal item causing this betterment results from improvement in the gum situation, of which the most important single factor is the more general use of the filter. In this connexion it is important to bear in mind that were it practicable to equip all appliances now in use with gum protective devices, the savings would be markedly higher.

Some Specific Results

Below are given some more specific results, based on detailed analyses:

In Philadelphia approximately 40% of the calls on ranges equipped with automatic top lighting result from the pilot when the latter is unprotected by a filter. Detailed analysis made on several occasions over a period of time, including a recent one on 2,000 ranges equipped with filters, shows that ranges so equipped—that is, with pilot filters —have one-fourth of the calls involving pilots that ranges not equipped with filters have.

This, of course, is a striking improvement and is a major contribution to improvement in customer-relations and reduction in service costs.

Of our 40,500 air-cooled refrigerators, 27,000 are equipped with filters and 13,500 are without. Detailed analysis of refrigerators equipped with filters, compared with those not equipped, shows a reduction attributable to the filter of 0.3 of a call and 50 cents per year per box. This is even more significant when it is realized that last year our average calls per air-cooled refrigerator was only a total of 0.8 of a call.

Based on the results of the eight months to date, the cost of servicing an air-cooled refrigerator will this year be something less than half of what it was a few years ago. Naturally, not all of this improvement is due to the filter, a number of other factors of importance coming in. However, our data clearly indicate that, again, the most important single factor in this improvement is the use of a gum filter.

In the case of automatic water heaters, detailed analytical data show a saving on water heaters equipped with filters against those not equipped of approximately $\frac{1}{5}$ of a call per year, or about 35 cents per water heater per year.

House Heaters

About a year ago, because of the material assistance of the filter in cutting calls and cost on other appliances, we adopted a requirement that all house heaters coming into Philadelphia, whether or not sold by us, must be equipped with filters. It is obviously too early to give definite data on this particular application, but it is quite clear to us that it has been an important factor in materially reducing pilot complaints.

Without going into detail, a general statement on our policy on filter installations in Philadelphia is that one is installed on every appliance sold by us in the city of Philadelphia, and on as many dealers' sales as possible, with the exception of certain automatic water heaters with reducing thermostats, where a filter of adequate capacity is not yet available.

On existing installations, where individual case histories justify, filters are cut in on the job. Since the institution of this latter policy, approximately 5,000 filters have been so installed in customers' homes on repeat complaints.

The question of cost of installation naturally comes into the picture. On new refrigerators and water heaters, the cost of installation is substantially *nil*, and the total cost involved is approximately that of the filters, which, in the case of the smaller one, is 25 to 30 cents, and, in the case of the larger one, is 83 to 88 cents, when bought in lots of 1,000. This statement is likewise nearly true in the case of new house heater and conversion burner installations. In the case of new gas ranges, the manufacturers install these for us at the factory and increase the price of the range to the Company by 50 cents.

In conclusion, after a rather broad experience extending over a period now approaching five years, with a total filter installation now approaching 100,000, we are convinced that the use of a properly-designed filter is a very profitable thing from the economic standpoint and of great importance as an aid in protecting the gas load from competitive inroads, and, in our judgment, the development of a satisfactory filter, which protects the stability of pilot and small flows, is the most important operating advance in the manufactured gas business in the last decade.

GAS IN WAR WORK IN AUSTRALIA*

OUR national crisis has stimulated many industries in Australia, gas being a prominent illustration. In most States, firms using gas as the main heat source are engaged in the manufacture of cartridges and other munitions of war. Gas is employed, also, in indirect service to Australia's war effort in so many directions that enumeration is impossible. This will be realized from a consideration of its use for making tins to carry jam, fruit, milk, bully beef, &c., to the troops, or, again, its use to supply power in butter factories, flour mills, or its use in testing and research laboratories attached to factories, technical schools, and universities engaged in war work. In most factories engaged in war work, gas provides the heat for cooking, hot water supply, heating the buildings, and, in many cases, for refrigeration in canteens. This is also the case for hospitals being erected or wounded men from the field.

In munitions manufacture, two important stages are the degreasing of parts and the final drying of lacquered goods. This is done by gas in numerous establishments. For brazing nose caps for mortar bombs, munition annexes in well known firms in our capital cities use gas-fired muffle furnaces in which a special protective and reducing gas atmosphere ensures that the flanges are copper brazed to the nose cap tubes. The work comes out of the furnace perfectly bright and well annealed. Similar work to this is being put into operation in brazing ignition caps for shells. Many thousands of components are dealt with each week.

Another atmosphere controlled furnace has been installed where it is used to bright anneal various components in the manufacture of practice bombs. For the miillions of cartridges being produced for service rifles and Bren guns, an essential stage is the softening of the brass barrel of the cartridge before insertion of the bullet. Manifolds of gas jets are used in the various Australian small arms factories for this job.

In manufacturing solid drawn steel tubing, such as is required for Admiralty boiler tubing, aeroplane components, &c., an Adelaide firm has lately adopted special gas atmospheres which, while the pipes are being annealed and subsequently cooled, prevent the formation of scale and ensure that the pipes are produced in a thoroughly bright condition.

In Victoria gas is used for shaping the nose of shells for naval and military use. Gas-fired salt baths and air recirculation furnaces are in daily use for the heat treatment of aluminium and magnesium alloys required for aircraft manufacture.

In dozens of factories and munition annexes, in Sydney, Melbourne, and Adelaide, gas-fired furnaces are used for heat treating cutting tools, dies, &c. Thus, throughout the Commonwealth, gas is the recognized fuel for this work.

Modern practice is to employ tungsten carbide cutting tips which are expensive but lasting. These are fastened by brazing on to steel shanks. This is most effectively done in numerous works by adopting gas furnace brazing in the presence of a neutral atmosphere.

Nowadays most electrical contacts for motor horns, X-ray equipment, &c., use tungsten points instead of platinum. These points must be brazed to the steel screws, rivets or other supports used. One firm uses for this purpose a gas-fired furnace with a muffle in which a special atmosphere ensures that the tips or points are effectively copper-brazed and the articles are obtained in a bright condition. Such contacts are required not only in normal peace-time industries but also in large numbers by the defence services.

* From the *National Gas Bulletin*.